



Best Collaboration of Embedded OS, **Android** and **TRON**

T-Kernel for Android Open Accessory

Supporting T-Kernel 2.0



Standard Price
(Tax not included)

With Touch Panel LCD
85,000yen

Without Touch Panel LCD
65,000yen

*As for the release date, please contact
our sales division.

- Development/Evaluation Kit for Peripheral Development for Android Terminals, using T-Kernel.
- Compliant with "Android Open Accessory" Specifications for Connecting Android Terminals and Peripheral Devices by USB.
- T-Kernel for Realtime Device Control. Android for Advanced GUI and Complicated Information Processing. Supporting Appropriate Allocation of Roles between Each OS.
- Including Development/Evaluation Board, T-Kernel 2.0 SDK, I/O Drivers for Peripheral Development, Sample Applications.

※To start program development, this product, Windows PC for development, Android terminal (2.3.4 or later / 3.1 or later), microSD card and USB cable are needed.

※The hardware and software including T-Kernel 2.0, development environment in this product are the same as the contents of "T-Kernel 2.0 Reference Kit", with the exception of Android Open Accessory related parts.

※Android terminal is not
provided with this product.

■ Features of "T-Kernel for Android Open Accessory"

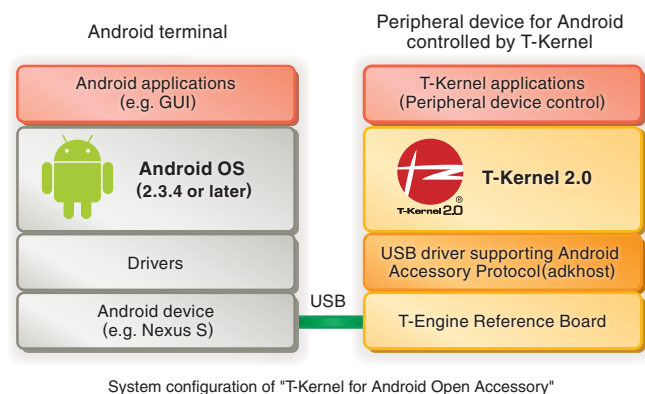
- This development and evaluation kit is designed for the peripheral development for Android terminals, using the realtime control OS, T-Kernel 2.0. This kit includes the development/evaluation board with ARM11 Core CPU, the software development kit with T-Kernel 2.0, USB driver supporting Android Accessory Protocol, I/O drivers for the peripheral development and sample applications.
- The attached USB driver automatically handles the protocols prescribed by Android Open Accessory, and provides a communication channel for Android terminal and a peripheral device with T-Kernel. So, you can concentrate the data processing depends on peripherals or applications without thinking about the specifications of Android Open Accessory.
- T-Kernel helps Android which is not good at realtime processing. You can easily develop ideal embedded devices by taking advantage of both Android and T-Kernel.



Execution screen of sample application(on Android)



Execution screen of sample application(on T-Kernel)



■ Applications

- Development of healthcare goods with Android(e.g. manometers).
- Development of advanced embedded devices controlled by Android terminal (e.g. digital signage, ticket-vending machine).
- Development of audio-visual equipments and home information appliances controlled by Android terminal.
- Development of equipments for houses and buildings controlled by Android terminal.
- Teaching materials for practical training of embedded programming using Android and T-Kernel.

■ Product Specification

Hardware

●CPU board

CPU	Renesas Electronics EMMA Mobile1-D (ARM11 Core,500MHz)
Flash ROM	32MB (NOR Flash)
RAM	64MB (CPU built-in)
eMMC	4GB, It can be used for the secondary storage.
JTAG-ICE I/F	for Kyoto Microcomputer Co., Ltd.'s PARTNER-Jet
Power supply	DC +5V, AC adapter
CPU board Dimensions	137mm×75mm (not including protrusions)
Metallic frame Dimensions	161mm×87mm (not including protrusions)
RoHS	Compliant
I/O Interfaces	
microSD slot	1 slot
LAN	10/100BASE-T, RJ-45 connector
USB-OTG(*1)	supporting USB 2.0, mini-AB connector
USB-UART(*2)	mini-B connector
Serial(*3)(*4)×2	RS-232 or CMOS level shift
Insulated I/O(*4)×4 bits	insulated GPIO by photo coupler
Sound(*4)	Microphone-in, Speaker-out
HLS(*4)	High-speed Link System
Others	Chip LED×4, PUSH Switch×4, illuminance sensor, temperature sensor, camera module (optional)

(*1) You need USB cable with USB mini-A connector for connecting USB devices such as mouse, keyboard, USB mass storage. The attached device driver supports functions for USB-Host, not supporting functions as USB-Function.

(*2) This can be used for debugging console by connecting USB of PC for development.

(*3) One piece of DSUB 9-pin connector (for Serial) is attached.

(*4) Box-type substrate connectors on CPU board are used.

●LCD board

LCD	4-inch, TFT color, 800×480 dots
Touch panel	Resistance film

* LCD board's specifications are applied to "with Touch Panel LCD" product. In case of "without Touch Panel LCD" product, LCD board is not attached.

Software

Target-side Software	
T-Monitor	PMC T-Monitor
T-Kernel	PMC T-Kernel 2.0
T-Kernel Extension	PMC T-Kernel Extension (process management, file management, etc)
Device drivers	microSD, LAN, USB 2.0 (for Host), Serial, RTC, KB/PD, Screen(LCD), Touch panel, USB-HID class, USB mass storage class, etc.
Middleware	PMC T-Shell (GUI middleware), Micro Script (Visual language), development tools including CLI, utilities, etc.
For Android Open Accessory	USB driver supporting Android Accessory Protocol, general-purpose DIO device driver, sample applications for T-Kernel
Host(Windows)-side Software(*5)	
SDK	Eclipse for PMC T-Kernel - GNU C/C++ compiler (designed for T-Kernel) - GDB (source-level debugger) - ANSI C Library, T-Kernel Library, sample sources, etc.
For Android terminals(*6)	
For Android Open Accessory	sample applications for Android

(*5) We have confirmed that the above host-side software run on Windows XP SP3, Windows Vista(only 32-bit version) and Windows 7(32-bit/64-bit version). GNU development environment with no GUI runs on Linux. We have checked the operation on Ubuntu 8.04.

(*6) The version number of Android has to be 2.3.4 or later / 3.1 or later. We have checked the operation on Nexus S.

■ Reference Books and Related Information

- T-Kernel Standard Handbook, Ken Sakamura (Ed.), **3800yen**.
* English documents are included as PDF files on CD-ROM.
- T-Kernel Kumikomi Programing Kyokasho (A Practical Guide to T-Kernel Embedded Programming), Ken Sakamura (Ed.), **4200yen**.
- Jissen TRON Kumikomi Programming(A Practical Guide to T-Kernel Embedded Programming for beginners), Ken Sakamura(Ed.), **3200yen**.
- TRONWARE Vol.1-132 (TRON bimonthly magazine, scheduled to be continued), **1200yen** (ordinary issue).
- * The above books are published by Personal Media Corporation in Japanese. Tax is not included.
- T-Kernel Kumikomi Programing Kyokasho(E-book for iPad), Ken Sakamura(Ed.).
- Jissen TRON Kumikomi Programming(E-book for iPad), Ken Sakamura(Ed.).
- * The above e-books are available at App Store. These e-books are written in Japanese.

T-Engine Forum <http://www.t-engine.org/>
 Personal Media Corporation (T-Engine Solution Website) <http://www.t-engine4u.com/en/>
 PMC International Retail Site <http://www.personal-media.co.jp/retail/>

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■TRON is an abbreviation of "The Real-time Operating System Nucleus".

■TRON, T-Engine, μT-Engine, T-Monitor, and T-Kernel are specified terms for computers, and are not product names.

■Due to continued product upgrade or enhancement, the information in this document is subject to change without notice.